REMARKS

Claims 1 through 44 are pending herein. By the Office Action, a reference listed in the Information Disclosure Statement is objected to due to a missing year and month of publication. The drawings are objected to for the correction of minor errors. By the Office Action, Claims 34, 35, and 44 are rejected under 35 U.S.C. 101 and 35 U.S.C. 112. Claims 1, 3, 18, 30, 37-40, and 42 are rejected under 35 U.S.C 112, second paragraph. Claims 1-17, 22-29, 34-41, and 43 are rejected under 35 U.S.C. 102(e) as being anticipated by Gounares et al. (U.S. Pat. No. 6,088,690). Claims 18-21, 30-35, 42 and 44 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gounares et a. in view of Sorrells (U.S. Pat. No. 6,144,953) and further in view of Schaffer et al. (U.S. Pat. No. 5,864,833) and further in view of Pretz (U.S. Pat. No. 6,014,658) and further in view of In re Harza (274 F.2d 669, 671, 124 USPQ 378, 380 (CCPA 1960)). The Specification is objected to for the presence of minor errors. By this amendment, the specification and drawings are amended to correct the minor errors noted by the examiner. By this amendment, the Information Disclosure is amended to include the omitted publication date of an item. Additionally, Claims 1, 3, 10, 18, 22, 30, 34, 35, and 37-42 are amended; Claim 44 is canceled; new Claim 45 is added. No new matter is added. Applicants respectfully traverse the rejection.

Rejection of Claims under U.S.C. 101

In the Office Action, Claims 34, 35, and 44 were rejected as not presenting an asserted utility. With this Amendment, Claims 34 and 35 are amended to include the utility of being in the form of a program to be run on a computer. Claim 44 is canceled and is replaced by new Claim 45 directed a computer readable medium. Because amended Claims 34 and 35 reflect a practical application in the technological arts, Applicants respectfully request that the rejection be withdrawn.

Rejection of Claims under U.S.C. 112

In the Office Action, Claims 1, 3, 18, 30, 37-40, and 42 were rejected as having various insufficient bases for limitation in the claims. By this amendment, the antecedent bases have been corrected or provided. Because the antecedents have been revised, the Applicants respectfully request that the rejection of Claims 1, 3, 18, 30, 37-40, and 42 be withdrawn.

Rejection of Claims Under U.S.C. 102(e)

The amendments to Claims 1-17, 22-29, 34-41, and 43 are broadening amendments submitted to more fully claim that which is Applicants' invention, and is not intended to limit or narrow the scope of the claims or to effect the Doctrine of Equivalents as it might be applied to the claims, were they unamended.

Applicants believe that the claims as amended hereby patentably distinguish over the cited art for the following reasons:

1. Complexity Module/Solver Module Interaction: The complexity module is a higher level supervising element that captures previous data on expected solver behavior as a function of problem parameters. Based on its knowledge of optimization behavior, it may alter the problem definition (perhaps by changing the number of constraints, etc.), change the optimization algorithm, or request additional system resources, such as processors, processing time, etc. The complexity module of the subject application may select among many possible solving models and various solving algorithms, whereas Gounares teaches only the use of genetic algorithms for finding the best input sequence of actions to a software system in order to find a bug. It repeatedly tries different input sequences until the shortest sequence producing a particular bug is found. The different input sequences (actions) are "chromosomes" in the genetic algorithm. Different input sequences are found by re-using earlier input sequences.
2. Complexity Prediction: In the subject application, a complexity module is used to predict solver behavior and thus assist in choosing between different solvers or solver parameter values (Specification, page 20, line 27 through page 21, line 28). Rather than using a single solver, complexity models are generated that link problem characteristics to various preferred solver configurations. Additionally, they predict the expected behavior when applying a solver configuration to a problem, which can be used to dynamically adapt the solver and to refine the complexity models if the solver's behavior diverges (specification, page 11, line 26 through page 12, line 11). Based on the complexity model, the desired error, and the computational constraints, the complexity model select an initial network architecture and implements a procedure to find an optimum. By comparing the expected rate of improvement to

the predicted rate and the achieved rate of improvement, upon termination of the initial procedure, the complexity module would then modify the network architecture and either perform another solver iteration, go to a different model, such as constrained optimization, or change the optimization procedure. In addition, from the deviations between the expected rate of error improvement and those predicted by the complexity model, the complexity module would be updated in order to better predict complexity in the future. Gounares, on the other hand does not perform any type of complexity prediction, i.e., there is no prediction of expected behavior. Gounares simply re-uses previous parameters that led to good solutions, with the expectation that parts of such parameters will combine to new parameters that might lead to better solutions. Optimization is based on the evaluation of past results, not the prediction of future results (Gounares, Figure 5, column 12, lines 14-34).

3. Adaptation: Gounares solves a problem using a single algorithm, namely one of the proposed specific genetic algorithms. This algorithm is not changed during the solving process. The same algorithm with the same solver parameters is used throughout the solving process. There is no adaptation of the algorithm. In contrast to this, the subject application teaches performing a solving step and then evaluating whether to stay with that solver or switch to another solver based on predicted behavior. Although the examiner suggests that the cross-over performed by Gounares is an adaptation step, that is not the case. The cross-over of Gounares is simply used until all possible actions in one parent chromosome are exhausted. In contrast to this, the subject application provides for adapting the solver by selecting different solver parameter values during the solving process. (Solver parameters should not be confused with partial or complete solutions. Chromosomes in a genetic algorithm are solutions, not solver parameters. Solver parameters in a genetic algorithm would, for example, be the mutation and extinction probabilities used for creating and removing chromosomes.)
4. Incremental Generation and Evaluation of Solutions: As mentioned above a solution in the Gounares method is an input sequence to the target software program. A step or iteration of the genetic algorithm is to generate a new, complete solution out of

previous solutions; this is not generating and evaluating solutions incrementally (Gounares, Figure 4). The method of the subject application, on the other hand, generates solutions incrementally and evaluates both the partial solution and the solving behavior, comparing expected with actual behavior, in order to adapt the solver if required (Specification, page 20, line 27 through page 21, line 28, and Figure 5).

Applicants believe that the claims as amended hereby patentably distinguish over the cited art because of the presence of a complexity module and its interaction with the solver module, complexity prediction, adaptation, and incremental generation and evaluation of solutions.

In view of the foregoing, it is submitted that the cited prior art fails to teach all of the features of the Applicants' invention. Because the cited art does not teach all of the features taught by the specification and amended claims of the subject application, Applicants believe that the subject application is patentably distinguished from the cited art. Therefore, it is respectfully requested that the rejection of Claims 1, 10, 22, 34, and 35 be withdrawn.

Insofar as Claims 2-9, 11-17, 23-28, and 36-41, inclusive, are concerned, these claims all include the limitations of and depend from now presumably allowable amended Claims 1, 10, 22, 34, and 35 respectively and are also believed to be in allowable condition for the reasons hereinbefore discussed with regard to Claims 1, 10, 22, 34, and 35. Reconsideration and withdrawal of the rejection are respectfully requested.

Rejection of Claims Under U.S.C. 103(a)

Applicants believe that the claims as amended hereby patentably distinguish over the cited art, since the combination of Gounares with Schaffer, Sorrells, and Pretz fails to teach all of the features of the Applicants' invention. As discussed in more detail above, Gounares fails to teach the presence of a complexity module and its interaction with the solver module, complexity prediction, adaptation, and incremental generation and evaluation of solutions, all of which are taught by the subject application. Schaffer, like Gounares, uses a genetic algorithm to solve problems, in this case the layout, setup, etc. of printed circuit boards, but does not provide the complexity module, prediction, adaptation, and incremental generation and evaluation of solutions of the subject application.

Sorrells describes a method for solving a problem incrementally using a fairly common approach, namely best-first search using a specific evaluation function. In such an approach, the solving method is seen as a search through a tree; nodes in the tree are partial solutions, and leaves are complete solutions. Starting from the root of the tree, and in each node in the tree, the question is always which on the children to try next, i.e., which branch of the tree to go down. Best-first search tries to evaluate each child, e.g., using the expected cost (for example, the number of nodes to a leaf), in order to determine which child to choose next. This is a single algorithm that does not change during the solving process. It does not compare the predicted cost of different algorithms on the same problem, but the predicted cost one algorithm for different nodes in the search tree, which is a simpler problem. This approach also doesn't compare predicted with actual cost, and it doesn't use such information to determine whether to continue on the same path or not. Thus Sorrells does not provide a complexity module, prediction capability, adaptation, and the evaluation of solutions taught by the subject application.

Because the combination of the cited art does not teach all of the features taught by the specification and amended claims of the subject application, Applicants believe that the subject application is patentably distinguished from the cited art. Additionally, Claims 18-21, 30-33, 42, and 44 inclusive, are concerned, these claims all include the limitations of and depend from now presumably allowable amended Claims 10, 22, 34, and 35 respectively and are also believed to be in allowable condition for the reasons hereinbefore discussed with regard to Claims 1, 10, 22, 34, and 35. Reconsideration and withdrawal of the rejection are respectfully requested.

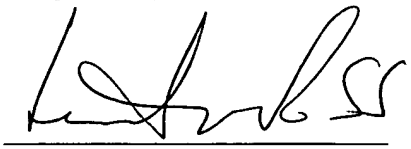
In view of the foregoing amendments and remarks, Applicants respectfully submit that the application is in condition for allowance. Favorable consideration and prompt allowance of the application are respectfully requested.

Entry of the above amendments is respectfully requested.

No additional fee is believed to be required for this amendment. However, the undersigned Xerox Corporation Attorney hereby authorizes the charging of any necessary fees, other than the issue fee, to Xerox Corporation Deposit Account No. 24-0025. This also constitutes a request for any needed extension of time and authorization to charge all fees therefor to Xerox Corporation Deposit Account No. 24-0025.

In the event the Examiner considers personal contact advantageous to the disposition of this case, s/he is hereby authorized to call Applicants' Attorney, Linda M. Robb, at telephone number (310) 333-3683, El Segundo, California.

Respectfully submitted,



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El Segundo, California
Date: May 12, 2004

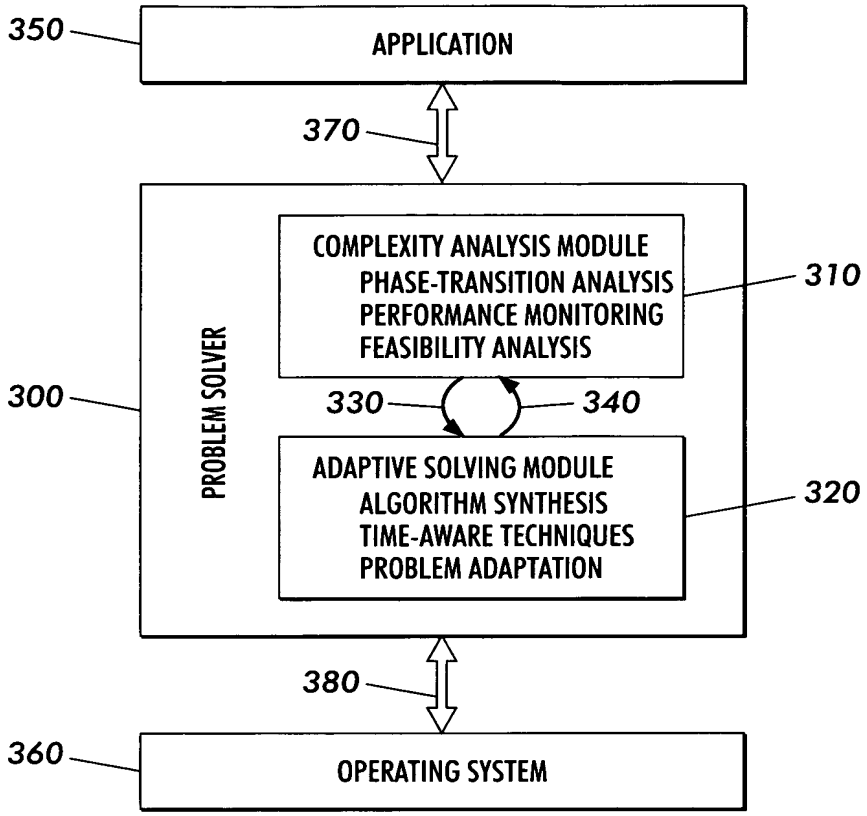

FIG. 3

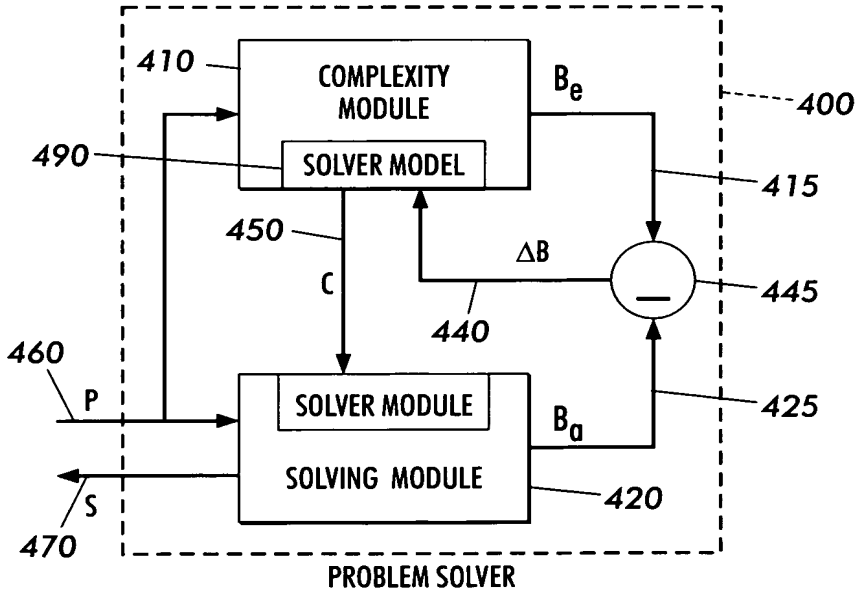

FIG. 4

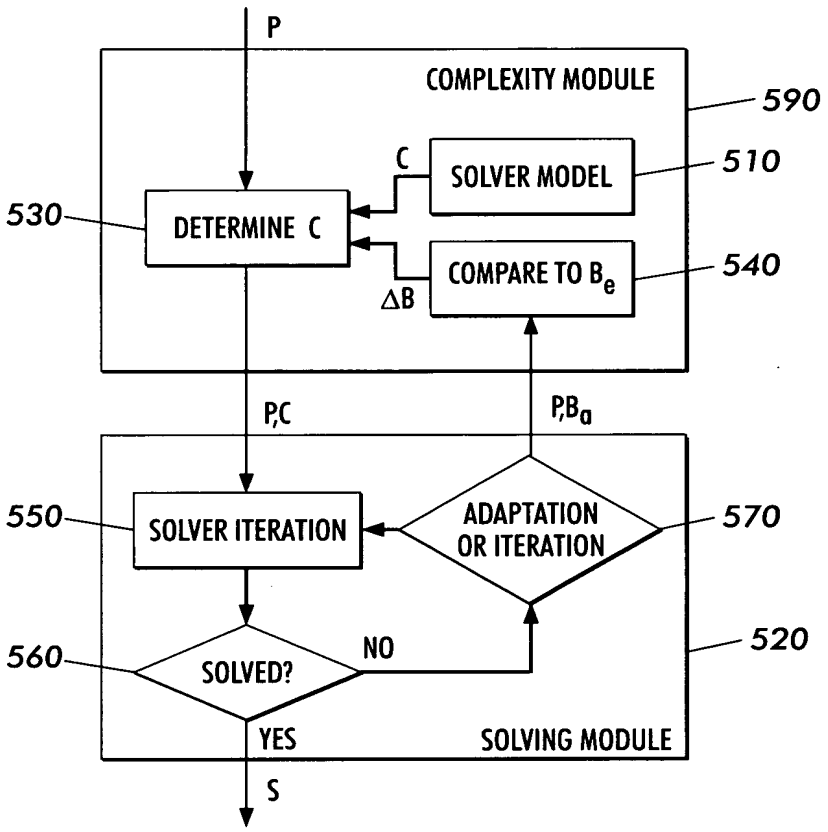

FIG. 5

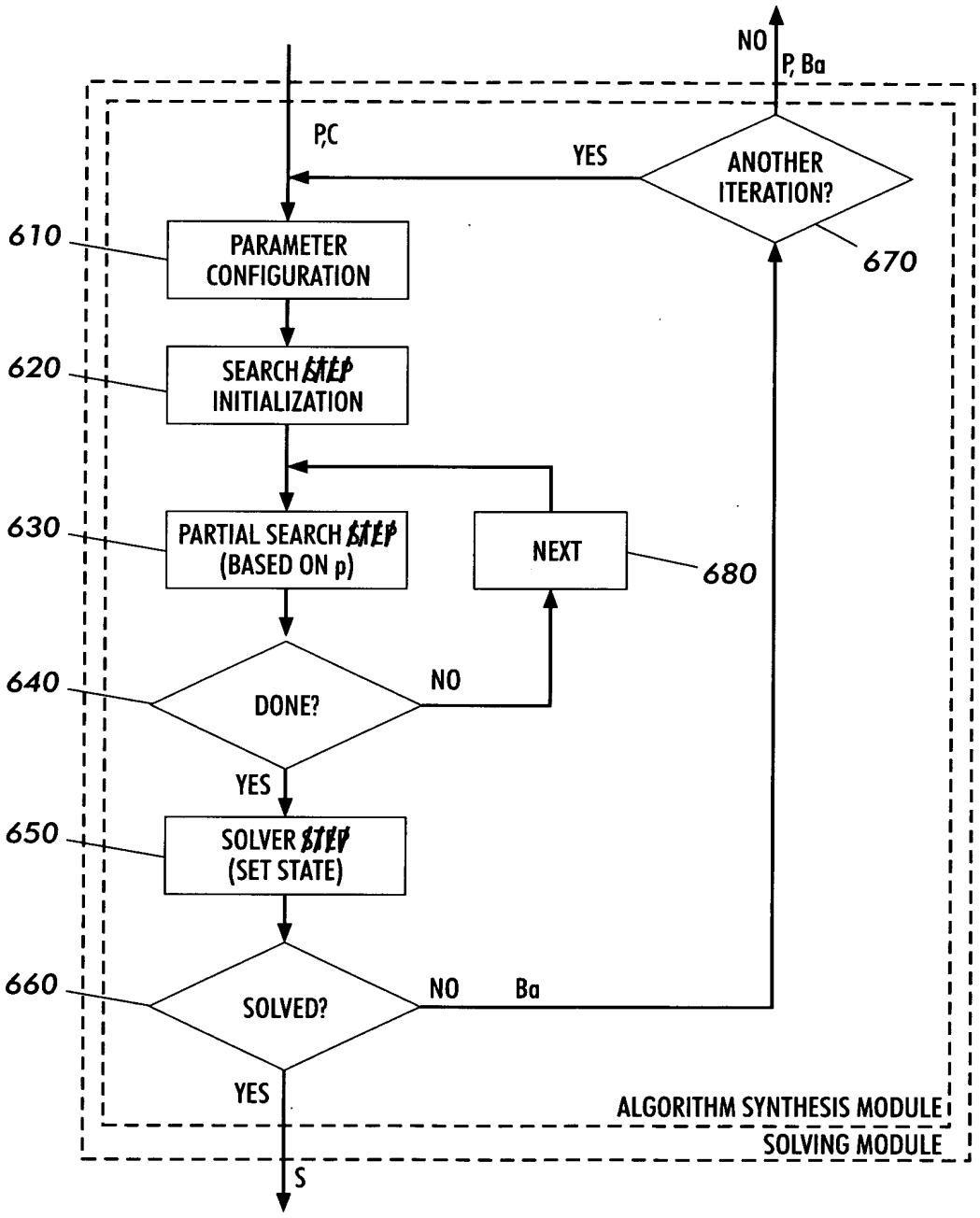

FIG. 6